



**Santa Clara Valley
Urban Runoff
Pollution Prevention Program**

C.3 Stormwater Handbook

VI

OPERATION AND MAINTENANCE

VI.1 INTRODUCTION

Maintenance is recognized as a critical component of stormwater treatment BMP effectiveness and useful life. In accordance with Provision C.3.e, each Co-permittee is responsible for implementing a program to verify that stormwater treatment BMPs on private and public property are properly operated and maintained. As a result, all owners/operators of developments subject to Provision C.3 are required to operate and maintain their BMPs so that they continue to perform properly as designed, and that they minimize potential nuisances and public health impacts from vector breeding. This chapter provides the following information:

The goal of the chapter is to provide owners and operators of permanent stormwater BMPs guidance in proper operation and maintenance of their facilities.

- Elements of stormwater BMP operation and maintenance (O & M) verification programs;
- Description of typical stormwater treatment BMP requirements of landowners;
- BMP fact sheets and guidance on how to use them;
- Municipality responsibilities in implementing their O & M program;
- Guidance on prioritizing and determining the frequency of stormwater treatment BMP inspections;
- Stormwater treatment BMP maintenance cost estimates;
- Options for disposal of residuals from stormwater treatment BMPs; and
- Vector control issues relating to BMP operations and maintenance.

The following discussion has been generalized to apply to all Co-permittees. Specific requirements and regulations for each Co-permittee may be inserted into Attachments VI-1 and VI-1 to this chapter.

VI.2 BMP OPERATION AND MAINTENANCE VERIFICATION PROGRAM

Each Co-permittee has developed or is developing a stormwater BMP operation and maintenance verification program to comply with the NPDES permit Provision C.3.e. The verification program is a compilation of elements that gives

the Co-permittee the framework to enforce stormwater treatment BMP maintenance. In addition, a verification program provides property owners direction in the operation and maintenance of their stormwater treatment BMPs.

Typical elements of a stormwater BMP operation and maintenance verification program are included in Table VI.1. Elements of primary importance include stormwater ordinances, maintenance agreements and arrangements, performance bonds and maintenance easement agreements.

**Table VI.1
Key Elements of a Typical Stormwater Treatment BMPs
Operation and Maintenance Verification Program¹**

• Stormwater Operation and Maintenance Ordinance
• Performance Bonds
• Inspection and Maintenance Agreements and Arrangements
• Maintenance Easement Agreements
• Construction Inspection Checklists
• Maintenance Inspection Checklists
• BMP Performance Criteria and Design Guidance
• BMP Maintenance Educational Materials
• BMP Tracking Systems
• Tracking Systems with Poor BMP Maintenance and Performance
• Maintenance Plans
• Maintenance Unit Costs
• Maintenance Notifications and Reminders
• Component for Following up on Poor Maintenance and Performance
• Pollution Prevention Compliance
• As-Built Certification
• Maintenance of Proprietary Products

Co-permittees have provided their Stormwater Treatment BMP Operation and Maintenance Verification Program (verification program) materials in Attachment VI-1. *For those Co-permittees still developing their verification program, several Program guidance memorandums are provided to assist with verification program set-up on the Program website at www.scvurppp.org.*

¹ Source: http://www.cwp.org/Maintenance_0702.htm

VI.3 REQUIREMENTS OF LANDOWNERS

Many of the elements in the verification program require compliance and performance by the landowner. Landowners who are subject to Permit Provision C.3 must comply with the operation and maintenance language of the Co-permittee's stormwater treatment BMP ordinance or policy. The purpose of the ordinance or policy is to ensure that:

- a) Stormwater treatment BMP designs facilitate ease of maintenance; and
- b) Regular inspection and maintenance activities are completed by the landowner.

Maintenance and operation ordinances usually consist of concise language requiring maintenance easement agreements, inspection and maintenance agreements, inspections, right-of-entry for inspection, consequences of failure to maintain practices, record keeping, enforcement and penalties.

The Co-permittee's stormwater verification program may require the submittal of performance and/or maintenance securities by the landowner. A performance security is a financial tool used to guarantee that in the event of a developer or contractor's default, funds are available to finish the construction of a stormwater treatment system and ensure its proper functioning. Maintenance securities are often required after construction to guarantee the performance of stormwater management systems.

Agreements for BMP maintenance and inspection and access are formal contracts between a local government and a property owner, such as a homeowners association, designed to ensure that specific maintenance functions are performed in exchange for permission to develop property. These agreements are typically recorded instruments, running with the land and binding on all future owners.

Basic language included in a typical agreement includes the following:

- a. *Performance of Routine Maintenance.* Private landowners (i.e., commercial/industrial property owners, homeowners associations, developers, private residents, etc.) must take responsibility for every aspect of maintenance, including routine maintenance and major repair. (Co-permittee responsibilities include inspection, education programs, maintenance tracking and enforcement.)
- b. *Annual Inspection/Maintenance and Certification.* Co-permittees require regular inspection of the stormwater treatment system by the landowner, with the actual frequency depending upon the type of BMP and the municipality's ordinance or guidelines. The inspection covers the entire facility, including berms, outlet structure, pond areas, access roads, etc. Observed deficiencies, required maintenance and repairs are documented in an inspection report that is submitted to the local municipality, who may then choose to verify facility information through inspection. Co-permittees require the landowner to certify that the stormwater system is

regularly inspected and maintained. The landowner may use a standardized inspection form provided by the Co-permittee for the inspections, included in Attachment VI-2, to facilitate uniform collection and reporting of data. To assist the landowner, Co-permittees may also provide maintenance fact sheets (see Chapter VI.4) and other appropriate documentation relating to proper long term operation and maintenance.

- c. *Inspection Requirements.* Co-permittees may commit to performing an annual verification inspection of the stormwater system, or may choose to inspect when deemed necessary, based on the type of treatment device, results of the self-inspection process and available resources.
- d. *Limitation of Liability.* The maintenance agreement imposes no liability of any kind whatsoever on the local municipality.
- e. *Failure to Maintain Stormwater Systems.* If a system is found to be in failure, there are civil or criminal penalties for operation and maintenance violations. Authority may be given in the agreement to the municipality to charge costs incurred for maintenance and repairs back to the property owner.
- f. *Access to Stormwater Systems.* Maintenance easement agreements grant permission to Co-permittees or their authorized agents and employees to enter a property (to inspect stormwater systems) whenever necessary. It ensures access from the public right-of-way and ample space to inspect and maintain stormwater management systems.

VI.4 STORMWATER TREATMENT BMP INSPECTION AND MAINTENANCE FACT SHEETS

In January 2003, the California Stormwater Quality Association (CASQA) updated the Municipal, New Development and Redevelopment, Construction and Industrial/Commercial Best Management Practice (BMP) handbooks that provide general guidance for selecting and implementing BMPs to reduce pollutants in runoff. Collectively, the four handbooks address BMP selection throughout the life of a project – from planning and design – through construction – and into operation and maintenance. Individually, each handbook is geared to a specific target audience during the project development. All four handbooks are available at www.cabmphandbooks.com.

As part of the Municipal BMP Handbook, CASQA developed 16 fact sheets that provide pertinent information on the inspection and maintenance requirements for treatment control BMPs. To supplement the CASQA treatment BMP fact sheets, Program staff developed fact sheets for an additional six (6) stormwater treatment system BMPs. A list of fact sheets is shown in Table VI.2. Copies of the fact sheets are provided in Attachment VI-3. Recommended inspection and maintenance frequencies are presented in each fact sheet.

**Table VI.2
Treatment Control BMP Fact Sheets**

BMP	Source	Reference Number
Bioretention	CASQA —	TC-32
Drain Insert*	CASQA —	MP-52
Exfiltration Trench	SCVURPPP	na
Extended Detention Basin	CASQA —	TC-22
Hydrodynamic Separators*	SCVURPPP	
Infiltration Basin	CASQA —	TC-11
Infiltration Trench	CASQA —	TC-10
Media Filter†*	CASQA —	TC-40, MP-40
Multiple Systems	CASQA —	TC-60
Planter Boxes	SCVURPPP	
Porous Pavement	SCVURPPP	
Retention/Irrigation	CASQA —	TC-12
Roof Gardens	SCVURPPP	
Underground Detention Systems*	SCVURPPP	
Vegetated Buffer Strip	CASQA —	TC-31
Vegetated Swale	CASQA —	TC-30
Vortex Separator*	CASQA —	MP-51
Water Quality Inlet	CASQA —	TC-50
Wet Pond	CASQA —	TC-20
Wet Vault*	CASQA —	MP-50
Wetland*	CASQA —	MP-20

* indicates treatment control is manufactured (proprietary)

† Two Fact Sheets (Public Domain and Proprietary) were created for this Treatment Control BMP

Maintenance Standards and Proper Inspection and Maintenance Procedures

Inspection maintenance standards identify the key parameters that trigger the need for maintenance activities for each BMP. For example, inspections of detention basins include measuring sediment accumulation with sediment measuring sticks. When sediment accumulates beyond established threshold values, sediment removal is required.

The maintenance standards assist private and public property owners in identifying proper inspection and maintenance procedures and assist public agency staff in the oversight of these facilities. The Co-permittees are developing maintenance standards² and public and private inspection and maintenance checklists for use during inspections.³ Inspection results will be documented and tracked over time (by municipal staff) to determine the effectiveness of maintenance activities.

**VI.5 MUNICIPALITY'S RESPONSIBILITIES IN THEIR
STORMWATER TREATMENT BMP INSPECTION PROGRAM**

To ensure long-term operation and maintenance (O&M) of stormwater treatment BMPs, it is necessary to include five (5) program elements into municipal inspection programs:

1. Maintain Information Regarding Installed Treatment BMPs. BMP information will be initially gathered with the Reporting Form for Planning Procedures Performance Standard and Provision C.3.n. Reporting Requirements (Attachment VII-4). For additional information on data management, see Chapter VII.
2. Establish Inspection Priorities and Frequencies. Each year, Co-permittees are required to inspect a subset of prioritized stormwater treatment systems for appropriate operation and maintenance, and to conduct any needed follow-up and correction. Eight (8) criteria (listed below, not in order of importance) were used by the Co-permittees to prioritize their municipal inspection list of public and privately-owned stormwater treatment BMPs.
 - Likelihood of failure resulting in high repair and/or replacement costs;
 - Level of maintenance needed for proper performance and operation;
 - Decline in operational effectiveness due to age;
 - Located in areas with ongoing construction activities (i.e., increased sediment loading);

² Model maintenance standards are found within the document entitled [*Utilities Surface Water Maintenance Standards for Public and Private Systems \(Draft\), December 2002*](#) and can be found on the Program website at www.scvurppp.org.

³ Model public and private inspection and maintenance checklists developed by the City of Bellevue, WA are provided on the Program website at www.scvurppp.org.

- Owned and/or maintained by residential owners;
- Complaints and/or facility owner/operator with history of non-compliance;
- Likelihood of creating habitats favorable for mosquito production; and
- Potential to support endangered species populations.

The last two (2) criteria, likelihood of mosquito production and potential to support endangered species, are under the purview of other agencies (i.e., Santa Clara County Vector Control District and U.S. Fish and Wildlife Service, respectively). As applicable, Co-permittees coordinate these aspects of their inspection programs with these agencies.

Municipal Inspection Frequencies. The Co-permittees have each developed initial jurisdiction-specific inspection frequencies that they must follow to ensure proper operation or compliance by landowners with maintenance standards. Co-permittees may adjust these frequencies over time to reflect actual BMP maintenance needs on a site-by-site basis.

The following factors are considered when determining appropriate inspection frequencies:

- Type of BMP;
- Local climate and precipitation;
- Land use type;
- Level of effort required for inspection. In general, BMPs with limited access (for maintenance) may require more frequent inspections;
- Existence of maintenance contracts;
- Fluctuation in economic resources; and
- CASQA BMP Municipal Handbook includes suggested inspection frequencies for stormwater treatment system BMPs constructed in California.

The Co-permittees may adjust these frequencies to accommodate site-specific conditions. For example, higher inspection frequencies should be considered for stormwater treatment system BMPs installed in areas that receive more rainfall. BMPs that treat large runoff volumes will accumulate higher amounts of pollutants over time. Inspection frequencies should also account for impacts from large storm events. Similarly, stormwater treatment system BMPs that are in land uses suspected of generating high concentrations of pollutants (e.g., sediments, oil and grease) should be inspected more frequently to ensure proper operation.

The mechanism by which stormwater treatment system BMPs are maintained can also impact the frequency of municipal inspection. If private property owners can demonstrate that maintenance is occurring according to design specifications or contracted out to a private

maintenance company, Co-permittees may consider giving these treatment controls a lower inspection priority.

The type and total number of BMPs inspected each year also depends on the cost of follow-up activities (e.g., the response required to address improperly maintained BMPs) and the availability of resources to conduct inspections. As a result, Co-permittees may have to adjust the type and total number of inspections conducted in a particular year based on available funding.

3. Provide Staff Training. To ensure proper facility inspection and maintenance of stormwater treatment BMPs, Co-permittees train their respective staffs in proper maintenance and operational procedures.
4. Conduct BMP Inspections. The four (4) major aspects of a stormwater treatment BMP inspection include:

- a) *Notify landowner of inspection.* The municipality provides educational materials⁴ to ensure that stormwater treatment BMP owners and operators are aware of their obligations and responsibilities regarding inspection and maintenance. The BMP Fact Sheets in Attachment VI-3 are a good educational resource regarding inspection and maintenance considerations.

A notification of inspection letter⁵ is provided to inform the BMP owner or operator that an inspection is scheduled. The letter supplies detailed information about what the BMP owner or operator can expect; encourages the completion of routine maintenance actions prior to the inspection, and other pertinent information relating to the inspection.

- b) *Pre-inspection preparation.* The municipal inspector reviews background information such as: site plans/as-built drawings; previous inspection results; necessary procedures (e.g., underground confined space entry); and inspection and maintenance protocols. At this time any necessary tools and equipment are assembled.
- c) *Conduct inspections.* Co-permittees use standardized inspection checklists to document each stormwater treatment BMP inspection. At a minimum, inspection checklists should:

- Contain specific parameters to reduce subjectivity;
- Link problems with specific actions;
- Track maintenance activities for BMPs over time; and
- Integrate well into a relational database.

⁴ A list of possible educational materials, site-specific information to review and inspection equipment to gather or review prior to an inspection is also provided on the on the Program website at www.scvurppp.org.

⁵ Examples of facility inspection notification letters are provided at the Program website at www.scvurppp.org.

- d. *Inspection follow-up and maintenance notification.* Written documentation is provided to the BMP owner or operator describing the inspection results and compliance status. In addition, the letter should include a list of necessary repairs or maintenance, if applicable, A Notice of Violation identifying the nature of the violation and list of repairs or maintenance needed to bring the facility into compliance. It identifies a compliance schedule and the consequences of non-compliance.
5. Prepare Documentation and Effectiveness Evaluation. Copies of all inspection related documents are returned by the Co-permittee for tracking. Chapter VII provides guidance on the overall strategy to manage data relevant to the reporting requirements described in Permit Provision C.3.e.iii.

VI.6 STORMWATER TREATMENT BMP MAINTENANCE COST ESTIMATES

Table VI.3 provides construction and maintenance cost estimates for selected stormwater treatment BMPs. Construction costs are included since several BMP O & M costs are presented as a percentage of the total construction cost. The cost estimates are “ballpark” figures and may be most useful at the planning level (i.e., comparison of relative costs between different treatment control BMPs) and may be of limited use for predicting actual BMP O & M costs.

Factors Influencing BMP Construction, Inspection and Maintenance Costs

A significant variation in construction and maintenance costs exists between selected stormwater treatment system BMPs (Table VI.3). Several factors influence BMP construction and maintenance costs:

- Type of BMP
- Size of BMP
 - Rainfall quantity
 - Drainage area size
 - Site characteristics (e.g., impervious area; soil stability)
- Location of BMP (i.e., above or below ground)

Other factors affecting maintenance costs include BMP access and disposing of collected residuals. Although a stormwater treatment BMP constructed below-surface is less costly to construct due to reduced land costs, it is more expensive to maintain than a surface measure. Sediment accumulation in stormwater treatment system BMPs is another factor that may affect maintenance costs. When residuals are disposed of at off-site landfills, disposers are required to follow the waste acceptance criteria established by each landfill. In most cases, landfills will accept sediments generated from residential stormwater conveyance structures without analytical results. However, disposers may be required to characterize (by analytical testing) sediments prior to disposal. Additional guidance regarding the disposal of BMP residuals at local landfills is provided in Chapter VI.7. This guidance also includes the waste acceptance criteria of several County landfills.

Table VI.3: Maintenance Costs

Stormwater treatment BMP	BMP Handbook ¹		EPA Study ²		BASMAA Guidance ³		CalTrans Study ⁴	
	Construct (units vary)	Annual Maintenance (units vary)	Construct (\$/cubic ft)	Annual Maintenance (% const cost)	Construct (\$/acre)	Annual Maintenance (total \$)	Construct (total \$)	Annual Maintenance (Hours)
Infiltration basin	\$2-18 cu ft	5-10% const costs	1.3	5-10			\$241,000- \$273,000	193
Infiltration trench	\$5-50 cu ft	5-20% const costs	4	5-20			\$196,000- \$218,000	70
Vegetated filter strip	\$0.3-0.7 sq ft	\$350/acre	0.0-1.3	\$320/acre			\$100,000	202
Vegetated swale	\$0.25-0.5 sq ft	\$0.58-0.75 per linear ft	0.5	5-7	240-669	\$790	\$59,000- \$156,000	211
Bioretention	\$3-40 sq ft	N/a	5.3	5-7				
Porous pavement	\$10,105 acre	\$3,960/year						
Wet pond	\$45k - 450k (1 acre-foot)	3-5% of const costs			11,065-13,600	\$500-2,600	\$694,000	570
Constructed wetland	\$57k (1 acre-foot)	3-5% of const costs	0.6-1.25	2				
Extended detention basin	\$41.6k (1 acre-foot)	3-5% of const costs	0.5-1.0	<1	4500	\$2,000	\$166,000- \$855,000	136
Media filter (Sand filter)	\$18.5k (1 acre site)	\$1706/year	3.0-6.0	11-13	15,900	N/a	\$231,000- \$479,000	93
Underground detention tank					18,375-183,900	N/a		
Drain inlet filter	\$2-3k	N/a			6,410-17,072	N/a	\$32,000-\$44,000	118
Oil/Water Separator							\$178,000	139

¹ California Stormwater Quality Association. Stormwater Best Management Practice Handbook: New Development and Redevelopment, April 2003 .

² United States Environmental Protection Agency, Office of Water. EPA-821-R-99-012: Preliminary Data Summary of Urban Storm Water Best Management Practices-Chapter 6: Costs and Benefits of Storm Water BMPs, August 1999.

³ Gary R. Minton. *A Survey of Installation and Maintenance Costs of Stormwater Treatment Facilities*, June 2003.

⁴ Stormwater Program, California State University-Sacramento: Office of Water Programs. *California Department of Transportation BMP Retrofit Pilot Program*, January 2001.

VI.7 THE DISPOSAL OF RESIDUALS FROM STORMWATER TREATMENT BMPS AT COUNTY LANDFILLS

Residuals are defined as trash, oil and grease, filter media and fine sediments that are collected from stormwater treatment BMPs that may or may not be contaminated. In general, results of various studies across the country indicate that residuals are not hazardous. As a result, most residuals can be disposed of at landfills after dewatering. This Chapter provides general guidelines for residual disposal and an EPA fact sheet on the topic. To supplement the information provided in EPA's fact sheet, information from local agencies and private companies was gathered on the procedures for testing, handling and disposing of stormwater treatment BMP residuals in Santa Clara County.

EPA Stormwater O & M Fact Sheet

The EPA fact sheet entitled [*Storm Water O&M Fact Sheet: Handling and Disposal of Residuals*](#) describes BMP maintenance programs and methods for handling and disposing of residuals from stormwater treatment BMPs⁶. The EPA Stormwater O & M fact sheet includes: 1) properties of residuals collected from a variety of stormwater treatment BMP treatment systems; 2) a general description of BMP operation and maintenance requirements; 3) key program elements for handling and disposing of residuals; and 4) specific information on residual disposal from case studies.

The fact sheet presents three general approaches to handling and disposing stormwater residuals. These include:

- Centralized treatment;
- Treatment at satellite facility or landfill; and
- On-site treatment.

Acceptance Criteria at Local Landfills

Table VI.4 provides a list of disposal facilities and locations obtained from the Santa Clara County Integrated Waste Management website (www.reducewaste.org). It also indicates which facilities accept sediment and the approximate cost for disposing non-hazardous residuals. All landfills in Santa Clara County are classified as Class II. This type of landfill only accepts non-hazardous waste that contains a minimum of 50 percent solids and no free liquids. Waste acceptance criteria for certain landfills within Santa Clara County include:

- Palo Alto Landfill – In accordance with the [*Draft Palo Alto Landfill Soil Acceptance Policy*](#), the soil acceptance review may require a certification statement of clean sources or a bulk chemistry sample. (Appendix G)

⁶ The EPA a fact sheet entitled [*Storm Water O&M Fact Sheet: Handling and Disposal of Residuals*](#) is provided on the Program website at www.scvurppp.org.

- Kirby Canyon Landfill – Laboratory analysis of soil material is required on a case-by-case basis. The Kirby Canyon Recycling and Disposal Facility: Waste Acceptance Criteria provides sampling and disposal information. (Appendix G)
- Newby Island Sanitary Landfill – Provides a list of site-specific waste constituent levels. (Appendix G)

Waste characterization requirements are usually based on land use; type of facility where sediments are generated; and past sampling results (i.e., additional testing is not necessarily required after first waste characterization).

**Table VI.4
Disposal Facility Location, Contact Information And Acceptable Waste Materials***

Disposal Facility	Type	Location	Contact	Sediment ("Soil") Accepted	Cost
Pacheco Pass Landfill	II	3675 Pacheco Pass Hwy Gilroy, CA	408-847-4142	Yes	\$3.00/ton
Newby Island Landfill	II	1601 Dixon Landing Rd Milpitas, CA	408-432-1234	Yes	\$7.15/ton
Kirby Canyon Landfill	II	910 Scheller Ave. San Jose, CA	408-779-2206	Yes	\$12.50/ton
Palo Alto Landfill**	II	2380 Embarcadero Rd Palo Alto, CA	650-329-2655	Yes	Unknown
Guadalupe Rubbish Disposal Co.	II	15999 Guadalupe Mines Rd San Jose, CA	408-268-1666	No	NA
Zanker Road Landfill	II	705 Los Esteros Rd San Jose, CA	408-263-2385	No	NA
Sunnyvale Transfer Station	II	301 Carl Rd Sunnyvale, CA	408-683-4443	No	NA
San Martin Transfer Station	II	14070 Llagas Ave San Martin, CA	408-847-4142	No	NA

*SWIS Data Base

** Palo Alto Landfill only accepts wastes generated by City of Palo Alto residents or businesses.

Handling and Disposal of Residuals by Private Companies

An option for property owners is to have a BMP company perform maintenance on their BMPs. Table VI.5 provides a list of typical maintenance activities for stormwater catch basin inserts and interceptor units. These companies generally require an annual maintenance contract with the property owner for each stormwater treatment BMP. Services typically provided include inspection, maintenance, handling and disposal of all residuals. Catch basins and inlet filters should be cleaned out before each storm and often during heavy storms to keep from clogging. Storm water interceptors and CDS units are usually cleaned twice

per year and the media filter is replaced annually. Debris and sediment is pumped out (using vacuum trucks), transported and disposed of at a local Class II landfill. The gray water collected from stormwater treatment systems is usually left within, placed back into the system (catch basin inlet filters) or removed and properly disposed. Maintenance costs for each stormwater treatment BMP are influenced by local conditions (e.g., land use activity and size of drainage area).

**Table VI.5
Typical Maintenance Activities for Selected BMPs**

Stormwater treatment BMP	Maintenance	Handling & Disposal of Residuals	Testing Performed²
Storm Water Catch Basin Inlet Filters	<ul style="list-style-type: none"> • Vacuum and Pressure wash before each storm and if necessary during storm • Replace filter media annually 	<ul style="list-style-type: none"> • Remove debris (litter, organic material) and sediment; disposed at Class II Landfill • Replace filter media; placed in 55-gallon drum and disposed at Class I Landfill 	<ul style="list-style-type: none"> • Annual test of sediment sample requested by landfill; • Obtain EPA Profile # for filter media
Storm Water Interceptors and CDS Units	<ul style="list-style-type: none"> • Inspect, measure and clean twice/year • Replace filter media annually 	<ul style="list-style-type: none"> • Remove debris (litter, organic material) and sediment; disposed at Class II Landfill • Replace filter media; placed in 55-gallon drum and disposed at Class I Landfill 	<ul style="list-style-type: none"> • Annual test of sediment sample requested by landfill; • Obtain EPA and CA waste codes for filter media

¹ Information was obtained from Ric Campos, President, Storm Water Inspector and Maintenance Services, Discovery Bay, CA.

² Cost for a single sediment sample was reported to be approximately \$2,000. Analytical testing requirements of residuals are determined by the landfill and are based on the stormwater treatment BMP type and land use activity (e.g., parking lots in commercial areas) occurring within the drainage area of the stormwater treatment BMP.

Filter media and contaminant pillows used in stormwater treatment systems are designed to absorb petroleum hydrocarbons present in stormwater runoff. As a result, all filter media is considered a Class I hazardous waste (when removed for disposal) and requires proper disposal in accordance with California EPA and RCRA regulations. The responsible party (hazardous waste generator) is required to assign all applicable California and EPA waste codes and place hazardous filter media within a Department of Transportation-approved shipping container for transport to a Class I landfill. Stormwater treatment BMP maintenance companies ensure proper handling and disposal of residuals and provide the property owner with certification of disposal in accordance with applicable regulations. Attachment III-4 provides a list of local maintenance companies.

Analytical testing requirements of residuals are determined by the landfill and are based on the stormwater treatment BMP type and land use activity (e.g., parking lots in commercial areas) occurring within the drainage area of the stormwater treatment BMP. For example, landfills usually require different analyses for

residuals collected from BMPs located within pre-construction land uses then for residuals collected from BMPs located within developed sites. In general, landfills require more stringent testing (i.e., additional constituents) for land uses that have a higher potential for stormwater pollution. If the initial analytical results are below the landfill's waste acceptance criteria threshold, the landfill will continue to accept residuals collected from stormwater treatment systems in the future, as long as the land use does not significantly change. Analytical testing costs range from \$400 to \$2,000.⁷

VI.8 VECTOR CONTROL ISSUES RELATING TO BMP OPERATION AND MAINTENANCE

Improper BMP design and maintenance are the two primary factors contributing to mosquito and other vector production (including midges, rodents, black flies and cockroaches). Guidance on proper design and site planning necessary to reduce the need for maintenance and to reduce the likelihood of mosquito vector problems is included in Chapter III. Additional information on maintenance is provided below.

There are several benefits of taking a proactive approach to vector control. They include:

- Avoiding the creation of public nuisances, potential fines, and subsequent corrective measures;
- Reducing the reliance on insecticides;
- Reducing long-term costs of vector control;
- Reducing the number of potential complaints; and
- Maintaining a good public perception.

Ultimately, proper BMP site design and maintenance will help ensure that the achievement of storm water quality objectives does not conflict with public health protection.

Proper BMP Maintenance to Reduce or Eliminate Mosquito Production

Adequate monitoring and routine maintenance is imperative to reduce or eliminate mosquito production. First and foremost, BMPs should be maintained so they do not hold standing water. Therefore, maintenance activities should focus on maintaining water flow by managing vegetation; reducing standing water by ensuring proper infiltration and drainage operation; and restricting access to systems with standing water by sealing off openings.

Certain BMPs may support additional numbers of vectors as the controls age. With proper ongoing maintenance, such degradation over time can be stemmed.



⁷ Charlie Fleischmann, Revel Environmental Manufacturing, and Dave Fitzpatrick, SWIMS

Mosquito Control

Periodic use of mosquito control agents may be necessary to reduce or eliminate mosquitoes in stormwater treatment BMPs. Within the urban environment, vector control measures that address the aquatic phases of a mosquito's life cycle (larvicides) are preferable to those control measures designed to address adult mosquitoes (adulticides). Once mosquitoes have reached their adult stage, they are capable of dispersal from aquatic systems, which makes adequate control nearly impossible, even when insecticides are dispersed into the air. Excessive application of insecticides can have potentially toxicological effects on aquatic life and other species.

The type and manner of application of mosquito control agents must meet the requirements of the Pesticide Control Management Plan included in the NPDES permit. In Santa Clara County, the Santa Clara County Vector Control District performs mosquito control.

Program's Relationship with the Santa Clara County Vector Control District

Permit Provision C.3 discusses the close collaboration and cooperative effort between the Co-permittees, local vector control agencies, Regional Board staff and the State Department of Health Services in identifying appropriate vector control measures that minimize potential nuisances and public health impacts resulting from vector breeding. To assist the Vector Control District in inventorying stormwater treatment BMPs that may be mosquito sources, Co-permittees should submit the following information to the Program on a routine basis (see below for more information):

- List of properties (public and private) with their physical address;
- Property owner/responsible party contact information;
- The type of treatment control BMP installed on the property.

The program will compile this information and provide it to the Santa Clara County Vector Control District. In addition, large stormwater treatment BMPs with vector control issues may require a Vector Control Management Plan. The Vector Control District is only interested in inspecting BMPs that might provide a suitable habitat for mosquito production.

VI.9 REFERENCES

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Additional resources, which are posted on the Program's website, provide BMP construction, inspection and maintenance costs. They include the following:

[Cost Analysis: Washington Department of Ecology Year 2001 Minimum Requirements for Stormwater Management in Western Washington](#) (prepared by Herrera Environmental Consultants, Inc, August 2001), posted on Program website at www.scvurppp.org.

[Best Management Practices Guide for Stormwater treatment BMP: Maintenance of Structural BMPs](#) (prepared by the Greater Vancouver Sewerage and Drainage District) posted on Program website at www.scvurppp.org



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Co-permittee Stormwater Treatment BMP Operation and Maintenance Verification Program

To be supplied by Co-permittee as Adopted

For those Co-permittees still developing their verification program, several Program guidance memorandums are provided to assist with verification program set-up on the Program website at www.scvurppp.org.



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Co-Permittee Inspection Form for Project Proponent

To be supplied by Co-permittee

Model public and private inspection and maintenance checklists developed by the City of Bellevue, WA are provided on the Program website at www.scvurppp.org.



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ATTACHMENT VI-3

California Stormwater BMP Handbook and SCVURPPP Maintenance Fact Sheets